

Naval Medical Center Portsmouth (NMCP) COVID-19 Literature Report

#91: Friday, 15 April 2022

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Purpose: These reports, published every other week on Fridays, are curated collections of current research, special reports, and news regarding the COVID-19 pandemic that may be of interest to medical providers, leadership, and decision makers. I welcome questions, suggestions for future topics, or other feedback. If this report made a difference or impacted patient care, please let me know!

All reports are available online at <https://nmcp.libguides.com/covidreport>. Access is private; you will need to use the direct link or bookmark the URL.

Disclaimer: I am not a medical professional. This document is current as of the date noted above. While I make every effort to find and summarize available data, I cannot cover everything in the literature on COVID-19. Due to the rapid evolution of the literature, I will not update past reports when new information arises; for retracted papers specific to COVID-19, see the [list of retracted papers from Retraction Watch](#).

TABLE OF CONTENTS

The Big Picture 2	Long COVID and Other Post-Infectious Findings . . 22
SARS-CoV-2 Virus and Variants 5	Pregnancy and Postpartum Period 27
Transmission, Exposure, and Surveillance 6	Pediatric Population 29
COVID-19 Vaccines 9	Healthcare Workers 31
Breakthrough Infections, Reinfections, and Coinfections 14	Mental Health and Wellness 34
Treatments and Management 16	Other Infectious Diseases and Public Health Threats 35
Pre-Existing Conditions and Comorbidities 19	References 37

The Big Picture

News in Brief

HHS has extended the COVID-19 public health emergency for at least 3 more months ([ASPR](#)).

"U.S. life expectancy continued to drop in 2021, new analysis shows" ([WP](#); see also: [medRxiv preprint](#)).

"COVID-19, overdoses pushed US to highest death total ever" ([AP](#)).

CDC

"CDC, under fire for covid response, announces plans to revamp agency" ([WP](#)).

"CDC can do better: five former directors on room for improvement" ([Medpage](#); see also: [recording of panel](#)).

Long Reads

"What will COVID-19 look like in 2100? Scientists predict three possible scenarios" ([Salon](#)).

"To find out where the covid pandemic is headed, look here: The sewer" ([WP](#)).

"Why so many COVID predictions were wrong: The eviction tsunami never happened. Neither did the 'she-cession.' Here are four theories for the failed economic forecasting of the pandemic era" ([Atlantic](#)).

Webinars

WHAT: What Is Our COVID-19 Future? Building the New Normal

PART OF: COVID Controversies – Ethical Challenges in Research & Treatment Series

WHEN: Tuesday, 26 April 2022 1300–1430 ET

DETAILS: "Two years have passed since the COVID-19 virus began circulating widely throughout the world. While vaccines and new treatment options have given us tools to combat the virus, additional changes will likely be needed if we are to mitigate future outbreaks and ensure that COVID-19 does not continue to cause major societal disruption. Join national experts, including authors of a major new report on ["Getting to and Sustaining the Next Normal: A Roadmap for Living with COVID"](#), to hear how we can move forward and build stability in the age of COVID. In this highly interactive webinar, panelists will discuss these pressing issues and respond to audience questions."

REGISTER: https://umn.qualtrics.com/jfe/form/SV_6xvubGFb2nVCUbc

Journal Articles

Lancet: [Estimating global, regional, and national daily and cumulative infections with SARS-CoV-2 through Nov 14, 2021: a statistical analysis](#) (08 April 2022)

"Background: Timely, accurate, and comprehensive estimates of SARS-CoV-2 daily infection rates, cumulative infections, the proportion of the population that has been infected at least once, and the effective reproductive number ($R_{\text{effective}}$) are essential for understanding the determinants of past infection, current transmission patterns, and a population's susceptibility to future infection with the same variant. Although several studies have estimated cumulative SARS-CoV-2 infections in select locations at specific points in time, all of these analyses have relied on biased data inputs that were not adequately corrected for. In this study, we aimed to provide a novel approach to estimating past SARS-CoV-2 daily infections, cumulative infections, and the proportion of the population infected, for 190 countries and territories from the start of the pandemic to Nov 14, 2021. This approach combines data from reported cases, reported deaths, excess deaths attributable to COVID-19, hospitalisations, and seroprevalence surveys to produce more robust estimates that minimise constituent biases.

Methods: We produced a comprehensive set of global and location-specific estimates of daily and cumulative SARS-CoV-2 infections through Nov 14, 2021, using data largely from Johns Hopkins University (Baltimore, MD, USA) and national databases for reported cases, hospital admissions, and reported deaths, as well as seroprevalence surveys identified through previous reviews, SeroTracker, and governmental organisations. We corrected these data for known biases such as lags in reporting, accounted for under-reporting of deaths by use of a statistical model of the proportion of excess mortality attributable to SARS-CoV-2, and adjusted seroprevalence surveys for waning antibody sensitivity, vaccinations, and reinfection from SARS-CoV-2 escape variants. We then created an empirical database of infection-detection ratios (IDRs), infection-hospitalisation ratios (IHRs), and infection-fatality ratios (IFRs). To estimate a complete time series for each location, we developed statistical models to predict the IDR, IHR, and IFR by location and day, testing a set of predictors justified through published systematic reviews. Next, we combined three series of estimates of daily infections (cases divided by IDR, hospitalisations divided by IHR, and deaths divided by IFR), into a more robust estimate of daily infections. We then used daily infections to estimate cumulative infections and the cumulative proportion of the population with one or more infections, and we then calculated posterior estimates of cumulative IDR, IHR, and IFR using cumulative infections and the corrected data on reported cases, hospitalisations, and deaths. Finally, we converted daily infections into a historical time series of $R_{\text{effective}}$ by location and day based on assumptions of duration from infection to infectiousness and time an individual spent being infectious. For

each of these quantities, we estimated a distribution based on an ensemble framework that captured uncertainty in data sources, model design, and parameter assumptions.

Findings: Global daily SARS-CoV-2 infections fluctuated between 3 million and 17 million new infections per day between April, 2020, and October, 2021, peaking in mid-April, 2021, primarily as a result of surges in India. Between the start of the pandemic and Nov 14, 2021, there were an estimated 3.80 billion (95% uncertainty interval 3.44-4.08) total SARS-CoV-2 infections and reinfections combined, and an estimated 3.39 billion (3.08-3.63) individuals, or 43.9% (39.9-46.9) of the global population, had been infected one or more times. 1.34 billion (1.20-1.49) of these infections occurred in south Asia, the highest among the seven super-regions, although the sub-Saharan Africa super-region had the highest infection rate (79.3 per 100 population [69.0-86.4]). The high-income super-region had the fewest infections (239 million [226-252]), and southeast Asia, east Asia, and Oceania had the lowest infection rate (13.0 per 100 population [8.4-17.7]). The cumulative proportion of the population ever infected varied greatly between countries and territories, with rates higher than 70% in 40 countries and lower than 20% in 39 countries. There was no discernible relationship between Reffective and total immunity, and even at total immunity levels of 80%, we observed no indication of an abrupt drop in Reffective, indicating that there is not a clear herd immunity threshold observed in the data.

Interpretation: COVID-19 has already had a staggering impact on the world up to the beginning of the omicron (B.1.1.529) wave, with over 40% of the global population infected at least once by Nov 14, 2021. The vast differences in cumulative proportion of the population infected across locations could help policy makers identify the transmission-prevention strategies that have been most effective, as well as the populations at greatest risk for future infection. This information might also be useful for targeted transmission-prevention interventions, including vaccine prioritisation. Our statistical approach to estimating SARS-CoV-2 infection allows estimates to be updated and disseminated rapidly on the basis of newly available data, which has and will be crucially important for timely COVID-19 research, science, and policy responses."

J Health Soc Behav: [Triage in Times of COVID-19: A Moral Dilemma](#) (02 April 2022)

"We present evidence from choice experiments on hypothetical triage decisions in a pandemic. Respondents have to decide who out of two patients gets ventilation. Patients are described in terms of attributes such as short-term survival chance, long-term life expectancy, and their current ventilation status. Attributes are derived from the ethical discourse among experts regarding triage guidelines during the COVID-19 pandemic and differ in the extent to which they are salient from a utilitarian or deontological perspective. Empirically, we find that although nonexperts agree with experts in prioritizing utilitarian attributes in triage decisions, nonexperts also consider the adherence to the norm of wearing face masks as particularly relevant. Furthermore, our study supports Greene and

colleagues' dual-process model of moral judgment; we find that utilitarian attributes are more decisive for respondents with a greater inclination toward utilitarianism and for respondents with a greater tendency toward reflection."

SARS-CoV-2 Virus and Variants

News in Brief

"UK has detected a new Covid variant. Here's what we know so far about omicron XE" ([CNBC](#)).

"BA.2 now behind 72% of all US COVID-19 cases" ([CIDRAP](#)).

Two new omicron subvariants have been identified in New York and are being tracked ([NYDH](#)).

Journal Articles

Clin Infect Dis: [Associations between SARS-CoV-2 variants and risk of COVID-19 hospitalization among confirmed cases in Washington State: a retrospective cohort study](#) (12 April 2022)

"Background: The COVID-19 pandemic is dominated by variant viruses; the resulting impact on disease severity remains unclear. Using a retrospective cohort study, we assessed the hospitalization risk following infection with seven SARS-CoV-2 variants.

Methods: Our study includes individuals with positive SARS-CoV-2 RT-PCR in the Washington Disease Reporting System with available viral genome data, from December 1, 2020 to January 14, 2022. The analysis was restricted to cases with specimens collected through sentinel surveillance. Using a Cox proportional hazards model with mixed effects, we estimated hazard ratios (HR) for hospitalization risk following infection with a variant, adjusting for age, sex, calendar week, and vaccination.

Findings: 58,848 cases were sequenced through sentinel surveillance, of which 1705 (2.9%) were hospitalized due to COVID-19. Higher hospitalization risk was found for infections with Gamma (HR 3.20, 95%CI 2.40-4.26), Beta (HR 2.85, 95%CI 1.56-5.23), Delta (HR 2.28 95%CI 1.56-3.34) or Alpha (HR 1.64, 95%CI 1.29-2.07) compared to infections with ancestral lineages; Omicron (HR 0.92, 95%CI 0.56-1.52) showed no significant difference in risk. Following Alpha, Gamma, or Delta infection, unvaccinated patients show higher hospitalization risk, while vaccinated patients show no significant difference in risk, both compared to unvaccinated, ancestral lineage cases. Hospitalization risk following Omicron infection is lower with vaccination.

Conclusion: Infection with Alpha, Gamma, or Delta results in a higher hospitalization risk, with vaccination attenuating that risk. Our findings support hospital preparedness, vaccination, and genomic surveillance."

MMWR: [Notes from the Field: SARS-CoV-2 Omicron Variant Infection in 10 Persons Within 90 Days of Previous SARS-CoV-2 Delta Variant Infection — Four States, October 2021–January 2022](#) (08 April 2022)

"This report describes 10 patients from four states, with whole genome sequencing (WGS)–confirmed Omicron variant infections within 90 days of a previous Delta infection."

Transmission, Exposure, and Surveillance

News in Brief

"FDA authorizes first COVID-19 diagnostic test using breath samples" ([FDA](#)).

"COVID vaccine plus infection can lead to months of immunity" ([Nature](#)).

"Study: About two thirds of Africans exposed to COVID-19" ([CIDRAP](#); see also: [medRxiv preprint](#)).

Long Reads

"Why the WHO took two years to say COVID is airborne: Early in the pandemic, the World Health Organization stated that SARS-CoV-2 was not transmitted through the air. That mistake and the prolonged process of correcting it sowed confusion and raises questions about what will happen in the next pandemic" ([Nature](#)).

Journal Articles

CMAJ Open: [Household transmission of SARS-CoV-2 from unvaccinated asymptomatic and symptomatic household members with confirmed SARS-CoV-2 infection: an antibody-surveillance study](#) (12 April 2022)

"Background: Household transmission contributes to SARS-CoV-2 spread, but the role of children in transmission is unclear. We conducted a study that included symptomatic and asymptomatic children and adults exposed to SARS-CoV-2 in their households with the objective of determining how SARS-CoV-2 is transmitted within households.

Methods: In this case-ascertained antibody-surveillance study, we enrolled households in Ottawa, Ontario, in which at least 1 household member had tested positive for SARS-CoV-2

on reverse transcription polymerase chain reaction testing. The enrolment period was September 2020 to March 2021. Potentially eligible participants were identified if they had tested positive for SARS-CoV-2 at an academic emergency department or affiliated testing centre; people who learned about the study through the media could also self-identify for participation. At least 2 participants were required for a household to be eligible for study participation, and at least 1 enrolled participant per household had to be a child (age < 18 yr). Enzyme-linked immunosorbent assays were used to evaluate SARS-CoV-2-specific IgA, IgM and IgG against the spike-trimer and nucleocapsid protein. The primary outcome was household secondary attack rate, defined as the proportion of household contacts positive for SARS-CoV-2 antibody among the total number of household contacts participating in the study. We performed descriptive statistics at both the individual and household levels. To estimate and compare outcomes between patient subgroups, and to examine predictors of household transmission, we fitted a series of multivariable logistic regression with robust standard errors to account for clustering of individuals within households.

Results: We enrolled 695 participants from 180 households: 180 index participants (74 children, 106 adults) and 515 of their household contacts (266 children, 249 adults). A total of 487 household contacts (94.6%) (246 children, 241 adults) had SARS-CoV-2 antibody testing, of whom 239 had a positive result (secondary attack rate 49.1%, 95% confidence interval [CI] 42.9%-55.3%). Eighty-eight (36.8%, 95% CI 29.3%-43.2%) of the 239 were asymptomatic; asymptomatic rates were similar for children (51/130 [39.2%, 95% CI 30.7%-48.5%]) and adults (37/115 [32.2%, 95% CI 24.2%-41.4%]) (odds ratio [OR] 1.3, 95% CI 0.8-2.1). Adults were more likely than children to transmit SARS-CoV-2 (OR 2.2, 95% CI 1.3-3.6). The odds of transmission from asymptomatic (OR 0.6, 95% CI 0.2-1.4) versus symptomatic (OR 0.9, 95% CI 0.6-1.4) index participants to household contacts was uncertain. Predictors of household transmission included household density (number of people per bedroom), relationship to index participant and number of cases in the household.

Interpretation: The rate of SARS-CoV-2 transmission within households was nearly 50% during the study period, and children were an important source of spread. The findings suggest that children are an important driver of the COVID-19 pandemic; this should inform public health policy."

J Epidemiol Community Health: [Occupation and COVID-19 diagnosis, hospitalisation and ICU admission among foreign-born and Swedish-born employees: a register-based study](#) (07 April 2022)

"Background: Research on occupation and risk of COVID-19 among foreign-born workers is lacking. We investigated whether working in essential occupations was associated with COVID-19 diagnosis, hospitalisation and intensive care unit (ICU) admission and whether foreign-born workers in similar occupations as Swedish-born individuals had a higher risk of the studied outcomes.

Methods: Occupational data (2018-2019) of 326 052 employees (20-65 years) who were resident in Sweden as of 1 January 2020 were linked to COVID-19 data registered from 1 January 2020 to 28 February 2021. We analysed the risk of COVID-19 outcomes in different occupational groups and in four immigrant/occupation intersectional groups using Cox proportional hazards regression with adjustments for sociodemographic and socioeconomic characteristics and pre-existing comorbidities.

Results: We identified 29797, 1069 and 152 cases of COVID-19 diagnosis, hospitalisations and ICU admissions, respectively, in our cohort. Workers in essential occupations had an elevated risk of COVID-19 diagnosis, hospitalisation, and ICU admissions. Healthcare workers had a higher risk of all the outcomes compared with other essential workers. Relative to Swedish-born workers in non-essential occupations, foreign-born workers in essential occupations had 1.85 (95% CI 1.78 to 1.93), 3.80 (95% CI 3.17 to 4.55) and 3.79 (95% CI 2.33 to 6.14) times higher risk of COVID-19 diagnosis, hospitalisation and ICU admission, respectively. The corresponding risks among Swedish-born workers in essential occupations were 1.44 (95% CI 1.40 to 1.49), 1.30 (95% CI 1.08 to 1.56) and 1.46 (95% CI 0.90 to 2.38).

Conclusion: Occupation was associated with COVID-19 outcomes and contributed to the burden of COVID-19 among foreign-born individuals in this study."

PLoS One: [CHARM: COVID-19 Health Action Response for Marines-Association of antigen-specific interferon-gamma and IL2 responses with asymptomatic and symptomatic infections after a positive qPCR SARS-CoV-2 test](#) (07 April 2022)

"SARS-CoV-2 T cell responses are associated with COVID-19 recovery, and Class I- and Class II-restricted epitopes have been identified in the spike (S), nucleocapsid (N) and membrane (M) proteins and others. This prospective COVID-19 Health Action Response for Marines (CHARM) study enabled assessment of T cell responses against S, N and M proteins in symptomatic and asymptomatic SARS-CoV-2 infected participants.

At enrollment all participants were negative by qPCR; follow-up occurred biweekly and bimonthly for the next 6 weeks. Study participants who tested positive by qPCR SARS-CoV-2 test were enrolled in an immune response sub-study. FluoroSpot interferon-gamma (IFN- γ) and IL2 responses following qPCR-confirmed infection at enrollment (day 0), day 7 and 14 and more than 28 days later were measured using pools of 17mer peptides covering S, N, and M proteins, or CD4+CD8 peptide pools containing predicted epitopes from multiple SARS-CoV-2 antigens.

Among 124 asymptomatic and 105 symptomatic participants, SARS-CoV-2 infection generated IFN- γ responses to the S, N and M proteins that persisted longer in asymptomatic cases. IFN- γ responses were significantly ($p = 0.001$) more frequent to the N pool (51.4%) than the M pool (18.9%) among asymptomatic but not symptomatic subjects.

Asymptomatic IFN- γ responders to the CD4+CD8 pool responded more frequently to the S pool (55.6%) and N pool (57.1%), than the M pool (7.1%), but not symptomatic participants. The frequencies of IFN- γ responses to the S and N+M pools peaked 7 days after the positive qPCR test among asymptomatic (S pool: 22.2%; N+M pool: 28.7%) and symptomatic (S pool: 15.3%; N+M pool 21.9%) participants and dropped by >28 days. Magnitudes of post-infection IFN- γ and IL2 responses to the N+M pool were significantly correlated with IFN- γ and IL2 responses to the N and M pools.

These data further support the central role of Th1-biased cell mediated immunity IFN- γ and IL2 responses, particularly to the N protein, in controlling COVID-19 symptoms, and justify T cell-based COVID-19 vaccines that include the N and S proteins."

Emerg Infect Dis: [Detecting SARS-CoV-2 Omicron B.1.1.529 Variant in Wastewater Samples by Using Nanopore Sequencing](#) (01 April 2022)

"We report wastewater surveillance for SARS-CoV-2 variants of concern by using mutation-specific, real-time PCR and rapid nanopore sequencing. This surveillance might be useful for an early warning in a scenario in which a new variant is emerging, even in areas that have low virus incidences."

COVID-19 Vaccines

News in Brief

"Through March 2022, we estimate that COVID-19 vaccination efforts in the U.S. prevented over 2 million deaths and 17 million hospitalizations" ([TCF](#)).

"CDC director clears up confusion on 2nd Covid boosters" ([NBC](#)).

"America created its own booster problems: Months of confusing messaging, piled onto existing inequities, kneecapped America's booster campaign before it had really started" ([Atlantic](#)).

Long Reads

"We need to be developing vaccines for the next pandemic — right now" ([Vox](#)).

"The next leap in coronavirus vaccine development could be a nasal spray: As the virus evolves, some scientists are calling for a change in vaccine strategy" ([WP](#)).

Journal Articles

MMWR: [Effectiveness of COVID-19 mRNA Vaccination in Preventing COVID-19–Associated Hospitalization Among Adults with Previous SARS-CoV-2 Infection — United States, June 2021–February 2022](#) (15 April 2022)

"What is already known about this topic? Persons with previous SARS-CoV-2 infection have some protection against reinfection leading to hospitalization, but there is limited evidence regarding the additional benefit of vaccination among these persons.

What is added by this report? Among persons with previous infection, COVID-19 mRNA vaccination provided protection against subsequent COVID-19–associated hospitalization. Estimated vaccine effectiveness against reinfection leading to hospitalization during the Omicron-predominant period was approximately 35% after dose 2, and 68% after a booster dose.

What are the implications for public health practice? To prevent COVID-19–associated hospitalization, all eligible persons should stay up to date with vaccination, including those with previous SARS-CoV-2 infection."

Boosters

Lancet Infect Dis: [COVID-19 vaccine waning and effectiveness and side-effects of boosters: a prospective community study from the ZOE COVID Study](#) (08 April 2022)

"Background: With the surge of new SARS-CoV-2 variants, countries have begun offering COVID-19 vaccine booster doses to high-risk groups and, more recently, to the adult population in general. However, uncertainty remains over how long primary vaccination series remain effective, the ideal timing for booster doses, and the safety of heterologous booster regimens. We aimed to investigate COVID-19 primary vaccine series effectiveness and its waning, and the safety and effectiveness of booster doses, in a UK community setting.

Methods: We used SARS-CoV-2 positivity rates in individuals from a longitudinal, prospective, community-based study (ZOE COVID Study), in which data were self-reported through an app, to assess the effectiveness of three COVID-19 vaccines (ChAdOx1 nCov19 [Oxford-AstraZeneca], BNT162b2 [Pfizer-BioNtech], and mRNA1273 [Moderna]) against infection in the 8 months after completion of primary vaccination series. In individuals receiving boosters, we investigated vaccine effectiveness and reactogenicity, by assessing 16 self-reported systemic and localised side-effects. We used multivariate Poisson regression models adjusting for confounders to estimate vaccine effectiveness.

Findings: We included 620 793 participants who received two vaccine doses (204 731 [33·0%] received BNT162b2, 405 239 [65·3%] received ChAdOx1 nCoV-19, and 10 823 [1·7%] received mRNA-1273) and subsequently had a SARS-CoV-2 test result between May 23 (chosen to exclude the period of alpha [B.1.1.7] variant dominance) and Nov 23, 2021. 62 172 (10·0%) vaccinated individuals tested positive for SARS-CoV-2 and were compared with 40 345 unvaccinated controls (6726 [16·7%] of whom tested positive). Vaccine effectiveness waned after the second dose: at 5 months, BNT162b2 effectiveness was 82·1% (95% CI 81·3-82·9), ChAdOx1 nCoV-19 effectiveness was 75·7% (74·9-76·4), and mRNA-1273 effectiveness was 84·3% (81·2-86·9). Vaccine effectiveness decreased more among individuals aged 55 years or older and among those with comorbidities. 135 932 individuals aged 55 years or older received a booster (2123 [1·6%] of whom tested positive). Vaccine effectiveness for booster doses in 0-3 months after BNT162b2 primary vaccination was higher than 92·5%, and effectiveness for heterologous boosters after ChAdOx1 nCoV-19 was at least 88·8%. For the booster reactogenicity analysis, in 317 011 participants, the most common systemic symptom was fatigue (in 31 881 [10·1%] participants) and the most common local symptom was tenderness (in 187 767 [59·2%]). Systemic side-effects were more common for heterologous schedules (32 632 [17·9%] of 182 374) than for homologous schedules (17 707 [13·2%] of 134 637; odds ratio 1·5, 95% CI 1·5-1·6, $p<0\cdot0001$).

Interpretation: After 5 months, vaccine effectiveness remained high among individuals younger than 55 years. Booster doses restore vaccine effectiveness. Adverse reactions after booster doses were similar to those after the second dose. Homologous booster schedules had fewer reported systemic side-effects than heterologous boosters."

NEJM: [Protection by a Fourth Dose of BNT162b2 against Omicron in Israel](#) (05 April 2022)

"Background: On January 2, 2022, Israel began administering a fourth dose of BNT162b2 vaccine to persons 60 years of age or older. Data are needed regarding the effect of the fourth dose on rates of confirmed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and of severe coronavirus disease 2019 (Covid-19).

Methods: Using the Israeli Ministry of Health database, we extracted data on 1,252,331 persons who were 60 years of age or older and eligible for the fourth dose during a period in which the B.1.1.529 (omicron) variant of SARS-CoV-2 was predominant (January 10 through March 2, 2022). We estimated the rate of confirmed infection and severe Covid-19 as a function of time starting at 8 days after receipt of a fourth dose (four-dose groups) as compared with that among persons who had received only three doses (three-dose group) and among persons who had received a fourth dose 3 to 7 days earlier (internal control group). For the estimation of rates, we used quasi-Poisson regression with adjustment for age, sex, demographic group, and calendar day.

Results: The number of cases of severe Covid-19 per 100,000 person-days (unadjusted rate) was 1.5 in the aggregated four-dose groups, 3.9 in the three-dose group, and 4.2 in the internal control group. In the quasi-Poisson analysis, the adjusted rate of severe Covid-19 in the fourth week after receipt of the fourth dose was lower than that in the three-dose group by a factor of 3.5 (95% confidence interval [CI], 2.7 to 4.6) and was lower than that in the internal control group by a factor of 2.3 (95% CI, 1.7 to 3.3). Protection against severe illness did not wane during the 6 weeks after receipt of the fourth dose. The number of cases of confirmed infection per 100,000 person-days (unadjusted rate) was 177 in the aggregated four-dose groups, 361 in the three-dose group, and 388 in the internal control group. In the quasi-Poisson analysis, the adjusted rate of confirmed infection in the fourth week after receipt of the fourth dose was lower than that in the three-dose group by a factor of 2.0 (95% CI, 1.9 to 2.1) and was lower than that in the internal control group by a factor of 1.8 (95% CI, 1.7 to 1.9). However, this protection waned in later weeks.

Conclusions: Rates of confirmed SARS-CoV-2 infection and severe Covid-19 were lower after a fourth dose of BNT162b2 vaccine than after only three doses. Protection against confirmed infection appeared short-lived, whereas protection against severe illness did not wane during the study period."

Prev Med Rep: [Booster vaccinations protect shipboard personnel from COVID-19](#) (04 April 2022)

"We report the recent experience of a shipboard crew who were exposed to COVID-19, yet appeared to be well protected by receipt of recent COVID-19 booster vaccinations."

Myocarditis

Circulation: [Prevalence, Characteristics, and Outcomes of COVID-19-Associated Acute Myocarditis](#) (12 April 2022)

"Background: Acute myocarditis (AM) is thought to be a rare cardiovascular complication of COVID-19, although minimal data are available beyond case reports. We aim to report the prevalence, baseline characteristics, in-hospital management, and outcomes for patients with COVID-19-associated AM on the basis of a retrospective cohort from 23 hospitals in the United States and Europe.

Methods: A total of 112 patients with suspected AM from 56 963 hospitalized patients with COVID-19 were evaluated between February 1, 2020, and April 30, 2021. Inclusion criteria were hospitalization for COVID-19 and a diagnosis of AM on the basis of endomyocardial biopsy or increased troponin level plus typical signs of AM on cardiac magnetic resonance imaging. We identified 97 patients with possible AM, and among them, 54 patients with definite/probable AM supported by endomyocardial biopsy in 17 (31.5%) patients or

magnetic resonance imaging in 50 (92.6%). We analyzed patient characteristics, treatments, and outcomes among all COVID-19-associated AM.

Results: AM prevalence among hospitalized patients with COVID-19 was 2.4 per 1000 hospitalizations considering definite/probable and 4.1 per 1000 considering also possible AM. The median age of definite/probable cases was 38 years, and 38.9% were female. On admission, chest pain and dyspnea were the most frequent symptoms (55.5% and 53.7%, respectively). Thirty-one cases (57.4%) occurred in the absence of COVID-19-associated pneumonia. Twenty-one (38.9%) had a fulminant presentation requiring inotropic support or temporary mechanical circulatory support. The composite of in-hospital mortality or temporary mechanical circulatory support occurred in 20.4%. At 120 days, estimated mortality was 6.6%, 15.1% in patients with associated pneumonia versus 0% in patients without pneumonia ($P=0.044$). During hospitalization, left ventricular ejection fraction, assessed by echocardiography, improved from a median of 40% on admission to 55% at discharge ($n=47$; $P<0.0001$) similarly in patients with or without pneumonia. Corticosteroids were frequently administered (55.5%).

Conclusions: AM occurrence is estimated between 2.4 and 4.1 out of 1000 patients hospitalized for COVID-19. The majority of AM occurs in the absence of pneumonia and is often complicated by hemodynamic instability. AM is a rare complication in patients hospitalized for COVID-19, with an outcome that differs on the basis of the presence of concomitant pneumonia."

Lancet Respir Med: [Myopericarditis following COVID-19 vaccination and non-COVID-19 vaccination: a systematic review and meta-analysis](#) (11 April 2022)

"Background: Myopericarditis is a rare complication of vaccination. However, there have been increasing reports of myopericarditis following COVID-19 vaccination, especially among adolescents and young adults. We aimed to characterise the incidence of myopericarditis following COVID-19 vaccination, and compare this with non-COVID-19 vaccination.

Methods: We did a systematic review and meta-analysis, searching four international databases from Jan 1, 1947, to Dec 31, 2021, for studies in English reporting on the incidence of myopericarditis following vaccination (the primary outcome). We included studies reporting on people in the general population who had myopericarditis in temporal relation to receiving vaccines, and excluded studies on a specific subpopulation of patients, non-human studies, and studies in which the number of doses was not reported. Random-effects meta-analyses (DerSimonian and Laird) were conducted, and the intra-study risk of bias (Joanna Briggs Institute checklist) and certainty of evidence (Grading of Recommendations, Assessment, Development and Evaluations approach) were assessed. We analysed the difference in incidence of myopericarditis among subpopulations,

stratifying by the type of vaccine (COVID-19 vs non-COVID-19) and age group (adult vs paediatric). Among COVID-19 vaccinations, we examined the effect of the type of vaccine (mRNA or non-mRNA), sex, age, and dose on the incidence of myopericarditis. This study was registered with PROSPERO (CRD42021275477).

Findings: The overall incidence of myopericarditis from 22 studies (405 272 721 vaccine doses) was 33.3 cases (95% CI 15.3–72.6) per million vaccine doses, and did not differ significantly between people who received COVID-19 vaccines (18.2 [10.9–30.3], 11 studies [395 361 933 doses], high certainty) and those who received non-COVID-19 vaccines (56.0 [10.7–293.7], 11 studies [9 910 788 doses], moderate certainty, $p=0.20$). Compared with COVID-19 vaccination, the incidence of myopericarditis was significantly higher following smallpox vaccinations (132.1 [81.3–214.6], $p<0.0001$) but was not significantly different after influenza vaccinations (1.3 [0.0–884.1], $p=0.43$) or in studies reporting on various other non-smallpox vaccinations (57.0 [1.1–3036.6], $p=0.58$). Among people who received COVID-19 vaccines, the incidence of myopericarditis was significantly higher in males (vs females), in people younger than 30 years (vs 30 years or older), after receiving an mRNA vaccine (vs non-mRNA vaccine), and after a second dose of vaccine (vs a first or third dose).

Interpretation: The overall risk of myopericarditis after receiving a COVID-19 vaccine is low. However, younger males have an increased incidence of myopericarditis, particularly after receiving mRNA vaccines. Nevertheless, the risks of such rare adverse events should be balanced against the risks of COVID-19 infection (including myopericarditis)."

Breakthrough Infections, Reinfections, and Coinfections

Journal Articles

JAMA Netw Open: [Association of Psychiatric Disorders With Incidence of SARS-CoV-2 Breakthrough Infection Among Vaccinated Adults](#) (14 April 2022)

"Question: Are psychiatric disorders associated with an increased risk for SARS-CoV-2 breakthrough infection after vaccination?

Findings: In this cohort study of 263 697 fully vaccinated US Department of Veterans Affairs patients, psychiatric disorder diagnoses were associated with increased incidence of SARS-CoV-2 breakthrough infection after vaccination.

Meaning: This study suggests that targeted strategies for preventing SARS-CoV-2 breakthrough infections should be considered for individuals with psychiatric disorders."

Emerg Infect Dis: [Secondary Attack Rate, Transmission and Incubation Periods, and Serial Interval of SARS-CoV-2 Omicron Variant, Spain](#) (07 April 2022)

"Contact tracing data of SARS-CoV-2 Omicron variant cases during December 2021 in Cantabria, Spain, showed increased transmission (secondary attack rate 39%) compared with Delta cases (secondary attack rate 26%), uninfluenced by vaccination status. Incubation and serial interval periods were also reduced. Half of Omicron transmissions happened before symptom onset in the index case-patient."

Clin Infect Dis: [SARS-CoV-2 Naturally Acquired Immunity vs. Vaccine-induced Immunity, Reinfections versus Breakthrough Infections: a Retrospective Cohort Study](#) (05 April 2022)

"Background: Waning of protection against infection with SARS-CoV-2 conferred by 2 doses of the BNT162b2 vaccine begins shortly after inoculation and becomes substantial within four months. With that, the impact of prior infection on incident SARS-CoV-2 reinfection is unclear. Therefore, we examined the long-term protection of naturally acquired immunity (protection conferred by previous infection) compared to vaccine-induced immunity.

Methods: A retrospective observational study of 124,500 persons, compared two groups: (1) SARS-CoV-2-naïve individuals who received a two-dose regimen of the BioNTech/Pfizer mRNA BNT162b2 vaccine, and (2) previously infected individuals who have not been vaccinated. Two multivariate logistic regression models were applied, evaluating four SARS-CoV-2-related outcomes - infection, symptomatic disease (COVID-19), hospitalization and death - between June 1 to August 14, 2021, when the Delta variant was dominant in Israel.

Results: SARS-CoV-2-naïve vaccinees had a 13.06-fold (95% CI, 8.08-21.11) increased risk for breakthrough infection with the Delta variant compared to unvaccinated-previously-infected individuals, when the first event (infection or vaccination) occurred during January and February of 2021. The increased risk was significant for symptomatic disease as well. When allowing the infection to occur at any time between March 2020 to February 2021, evidence of waning naturally acquired immunity was demonstrated, though SARS-CoV-2 naïve vaccinees still had a 5.96-fold (95% CI, 4.85-7.33) increased risk for breakthrough infection and a 7.13-fold (95% CI, 5.51-9.21) increased risk for symptomatic disease.

Conclusions: Naturally acquired immunity confers stronger protection against infection and symptomatic disease caused by the Delta variant of SARS-CoV-2, compared to the BNT162b2 two-dose vaccine-induced immunity."

Emerg Infect Dis: [Effectiveness of BNT162b2 Vaccine Booster against SARS-CoV-2 Infection and Breakthrough Complications, Israel](#) (31 March 2022)

"We estimated vaccine effectiveness (VE) of the BNT162b2 (Pfizer-BioNTech, <https://www.pfizer.com>) booster dose against SARS-CoV-2 infection and reduction of complications (hospitalization, severe disease, and death) among breakthrough cases in

persons in Israel >16 years of age for <20 weeks. VE estimates reached 96.8% (95% CI 96.0%-97.5%) for persons 16-59 years of age and 93.1% (95% CI 91.8%-94.2%) for persons >60 years of age on week 3. VE estimates remained at these levels for 8 weeks in the 16-59 age group and 11 weeks in those >60. A slow decline followed, becoming more pronounced in the last 2-3 weeks of evaluation. Estimates in the last week of evaluation were 77.6% (95% CI 68.4%-84.2%) and 61.3% (52.5%-68.4%) for persons 16-59 years and >60 years. The more pronounced VE decline coincided with rapid increase in Omicron variant activity. Rate reduction of breakthrough complications remained moderate to high throughout the evaluation."

Treatments and Management

News in Brief

As of 05 April 2022, "sotrovimab is no longer authorized to treat COVID-19 in any U.S. region due to increases in the proportion of COVID-19 cases caused by the Omicron BA.2 sub-variant" ([FDA](#)).

"In an interim analysis of a phase III trial, investigational oral drug sabizabulin cut the risk of COVID-19 death by 55% in hospitalized patients at high risk for acute respiratory distress syndrome" ([Medpage](#); see also: [Veru press release](#)).

"What triggers severe COVID? Infected immune cells hold clues" ([Nature](#)).

Journal Articles

JAMA Netw Open: [Association of Subcutaneous or Intravenous Administration of Casirivimab and Imdevimab Monoclonal Antibodies With Clinical Outcomes in Adults With COVID-19](#) (12 April 2022)

"Question: Is subcutaneous treatment with casirivimab and imdevimab associated with improved 28-day clinical outcomes compared with nontreatment, and is it clinically similar to intravenously administered casirivimab and imdevimab for outpatients with COVID-19?

Findings: In this cohort study of 1959 propensity-matched outpatients with mild to moderate COVID-19 symptoms, the 28-day rate of hospitalization or death was 3.4% vs 7.0% for those receiving subcutaneous treatment vs nontreatment. In a second cohort analysis of 2185 outpatients, the 28-day rate of hospitalization or death was 2.8% vs 1.7% for subcutaneous vs intravenous treatment.

Meaning: Subcutaneous casirivimab and imdevimab was associated with reduced hospitalization and death compared with nontreatment and showed similar outcomes compared with intravenous casirivimab and imdevimab in outpatients with COVID-19."

Open Forum Infect Dis: [Effectiveness Of Casirivimab-Imdevimab Monoclonal Antibody Treatment Among High-Risk Patients With SARS-CoV-2 B.1.617.2 \(COVID-19 Delta Variant\) Infection](#) (12 April 2022)

"BACKGROUND: Real-world data on the effectiveness of neutralizing Casirivimab-Imdevimab monoclonal antibody (Cas-Imd mAb) against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection among high-risk patients may inform the response to future SARS-CoV-2 variants.

METHODS: This study covers an observational retrospective data analysis in Banner Health Care System sites, mainly in Arizona. During the study period, the prevalence of SARS-CoV-2 Delta variant was between 95% and 100%. Out of 29,635 patients who tested positive for COVID-19 between 8/1/2021 and 10/30/2021, in Banner Health Care System, the study cohort was split into 4213 adult patients who received Cas-Imd mAb (1200 mg) treatment compared to a propensity-matched 4213 untreated patients. The primary outcomes were the incidence of all-cause hospitalization, intensive care unit (ICU) admission, and mortality within 30 days of Cas-Imd mAb administration or COVID-19 Delta variant infection.

RESULTS: Compared to the propensity matched untreated cohort, the Cas-Imd mAb cohort had significantly lower all-cause hospitalization (4.2% vs 17.6%; difference in percentages and 95% confidence interval [CI] -13.4 [-14,7, -12.0], $P < .001$), ICU admission (0.3% vs 2.8%; difference and CI -2.4 [-3.0, -1.9], $P < .001$), and mortality (0.2% vs 2.0%; difference and CI -1.8 [-2.3, -1.3], $P < .001$) within 30 days. The Cas-Imd mAb treatment was associated with lower rate of hospitalization (hazard ratio [HR], 0.22; 95% CI, 0.19-0.26; $P < .001$) and mortality (HR, 0.11; 95% CI, 0.06-0.21; $P < .001$).

CONCLUSIONS: Cas-Imd mAb treatment was associated with a lower hospitalization rate, ICU admission, and mortality within 30 days among patients infected with COVID-19 Delta variant."

EBioMedicine: [Cardiovascular signatures of COVID-19 predict mortality and identify barrier stabilizing therapies](#) (08 April 2022)

"Background: Endothelial cell (EC) activation, endotheliitis, vascular permeability, and thrombosis have been observed in patients with severe coronavirus disease 2019 (COVID-19), indicating that the vasculature is affected during the acute stages of SARS-CoV-2 infection. It remains unknown whether circulating vascular markers are sufficient to predict clinical outcomes, are unique to COVID-19, and if vascular permeability can be therapeutically targeted.

Methods: Prospectively evaluating the prevalence of circulating inflammatory, cardiac, and EC activation markers as well as developing a microRNA atlas in 241 unvaccinated patients with suspected SARS-CoV-2 infection allowed for prognostic value assessment using a Random Forest model machine learning approach. Subsequent ex vivo experiments assessed EC permeability responses to patient plasma and were used to uncover modulated gene regulatory networks from which rational therapeutic design was inferred.

Findings: Multiple inflammatory and EC activation biomarkers were associated with mortality in COVID-19 patients and in severity-matched SARS-CoV-2-negative patients, while dysregulation of specific microRNAs at presentation was specific for poor COVID-19-related outcomes and revealed disease-relevant pathways. Integrating the datasets using a machine learning approach further enhanced clinical risk prediction for in-hospital mortality. Exposure of ECs to COVID-19 patient plasma resulted in severity-specific gene expression responses and EC barrier dysfunction, which was ameliorated using angiopoietin-1 mimetic or recombinant Slit2-N.

Interpretation: Integration of multi-omics data identified microRNA and vascular biomarkers prognostic of in-hospital mortality in COVID-19 patients and revealed that vascular stabilizing therapies should be explored as a treatment for endothelial dysfunction in COVID-19, and other severe diseases where endothelial dysfunction has a central role in pathogenesis."

Lancet: [Symptom prevalence, duration, and risk of hospital admission in individuals infected with SARS-CoV-2 during periods of omicron and delta variant dominance: a prospective observational study from the ZOE COVID Study](#) (07 April 2022)

"Background: The SARS-CoV-2 variant of concern, omicron, appears to be less severe than delta. We aim to quantify the differences in symptom prevalence, risk of hospital admission, and symptom duration among the vaccinated population.

Methods: In this prospective longitudinal observational study, we collected data from participants who were self-reporting test results and symptoms in the ZOE COVID app (previously known as the COVID Symptoms Study App). Eligible participants were aged 16-99 years, based in the UK, with a body-mass index between 15 and 55 kg/m², had received at least two doses of any SARS-CoV-2 vaccine, were symptomatic, and logged a positive symptomatic PCR or lateral flow result for SARS-CoV-2 during the study period. The primary outcome was the likelihood of developing a given symptom (of the 32 monitored in the app) or hospital admission within 7 days before or after the positive test in participants infected during omicron prevalence compared with those infected during delta prevalence.

Findings: Between June 1, 2021, and Jan 17, 2022, we identified 63 002 participants who tested positive for SARS-CoV-2 and reported symptoms in the ZOE app. These patients were matched 1:1 for age, sex, and vaccination dose, across two periods (June 1 to Nov 27, 2021,

delta prevalent at >70%; n=4990, and Dec 20, 2021, to Jan 17, 2022, omicron prevalent at >70%; n=4990). Loss of smell was less common in participants infected during omicron prevalence than during delta prevalence (16.7% vs 52.7%, odds ratio [OR] 0.17; 95% CI 0.16-0.19, p<0.001). Sore throat was more common during omicron prevalence than during delta prevalence (70.5% vs 60.8%, 1.55; 1.43-1.69, p<0.001). There was a lower rate of hospital admission during omicron prevalence than during delta prevalence (1.9% vs 2.6%, OR 0.75; 95% CI 0.57-0.98, p=0.03).

Interpretation: The prevalence of symptoms that characterise an omicron infection differs from those of the delta SARS-CoV-2 variant, apparently with less involvement of the lower respiratory tract and reduced probability of hospital admission. Our data indicate a shorter period of illness and potentially of infectiousness which should impact work-health policies and public health advice."

JAMA Netw Open: [Implementation of Clinical Practice Guidelines for Hospitalized Patients With COVID-19 in Academic Medical Centers](#) (04 April 2022)

"This survey study assesses the rate at which US academic medical centers have adopted evidenced-based guidelines for the management of COVID-19 into practice."

Pre-Existing Conditions and Comorbidities

News in Brief

"Pandemic anxiety was hard on IBS patients. Here's how to find relief" ([NPR](#)).

"Covid vaccines didn't work for many cancer patients — but researchers are designing a new shot for them" ([STAT](#)).

Journal Articles

JAMA Netw Open: [Immunogenicity and Risk Factors Associated With Poor Humoral Immune Response of SARS-CoV-2 Vaccines in Recipients of Solid Organ Transplant: A Systematic Review and Meta-Analysis](#) (12 April 2022)

"Question: What are the humoral immune response rates and risk factors associated with diminished response after COVID-19 vaccination in recipients of solid organ transplant?

Findings: In this systematic review and meta-analysis of 29 studies and 11 713 recipients of solid organ transplant, seroconversion rates increased with progressively increased numbers of mRNA COVID-19 vaccine doses. Older age, recent transplantation, deceased

donor status, active use of antimetabolites, and recent exposure to antithymocyte globulin or rituximab were risk factors associated with diminished humoral immune response after receiving 2 doses of mRNA vaccines.

Meaning: These findings suggest that more efforts are needed to modulate the risk factors associated with reduced humoral responses among recipients of solid organ transplant."

Alzheimers Dement: [Clinical outcomes of COVID-19 infection among patients with Alzheimer's disease or mild cognitive impairment](#) (04 April 2022)

"Introduction: Alzheimer's disease (AD) and COVID-19 share common risk factors including hypertension. Angiotensin converting enzyme inhibitors (ACEI) and angiotensin II receptor blockers (ARB) are frequently prescribed antihypertension medications.

Methods: This study analyzed 436,823 veterans tested for SARS-CoV-2 infection. We conducted both classical and propensity score weighted logistic models to compare COVID-19 outcomes between patients with AD or mild cognitive impairment (MCI) to those without cognitive impairment, and examined effect of ACEI/ARB prescription.

Results: There was a statistically significant association between AD and increased odds of infection and mortality. MCI was not found to be a risk factor for infection. Subjects with MCI exhibited poor clinical outcomes. Prescribing ARBs but not ACEIs was significantly associated with a lower risk of COVID-19 occurrence among AD and MCI patients.

Discussion: Exploring beneficial effects of existing medications to reduce the impact of COVID-19 on patients with AD or MCI is highly significant."

Cureus: [Investigation Into the Effect of COVID-19 Infection on Length of Hospital Stay and Mortality in Patients With Rheumatoid Arthritis](#) (28 February 2022)

"Background: SARS-CoV-2 (COVID-19) is a positive-stranded ribonucleic acid (RNA) virus of the coronavirus family, which has resulted in one of the most serious pandemics, with more than 14 million cases confirmed globally. Rheumatoid arthritis (RA) is estimated to be prevalent in 0.5-1% of the U.S. population. So far, there has been little evidence of COVID-19 infection and its propensity to result in increased mortality or length of hospital stay in patients with RA. To contribute to this body of literature, this study will assess the degree to which COVID-19 is associated with increased mortality and length of hospital stay in patients with RA while also taking into account these patients' comorbidities.

Methods: Our retrospective study included 14,180 patients (age >18, median 58, range 18-90) who tested positive for COVID-19 or were assumed to have COVID-19 infection from January 1st, 2020, through July 31st, 2020. Patients were grouped based on the diagnosis of RA and COVID-19 infection versus those without RA. Patients who were diagnosed with systemic lupus erythematosus (SLE), chronic obstructive pulmonary disease, and

hypertension were excluded. Covariates included age, body mass index (BMI), race, sex, maximum C-reactive protein value, maximum D-dimer value, and comorbid diabetes mellitus. Outcome measures were length of hospital stay (LOS), in-hospital mortality, intensive care unit (ICU) admission, ICU LOS, mechanical ventilation, time on mechanical ventilation, and discharge to hospice. The logistic regression model was used to estimate the probability of in-hospital mortality, ICU admission, placement on mechanical ventilation, discharge to hospice, and in-hospital mortality related to home anti-inflammatory use when comparing patients with RA and COVID-19 infection to COVID-19 infected patients without RA.

Results: Of the total 14,180 patients (males 57.1%, females 42.9%), 159 patients (1.1%), had a diagnosis of RA. There was no significant association between RA and hospital LOS, ICU admission, ICU LOS, LOS on mechanical ventilation, or discharge to hospice among those infected with COVID-19. Yet, RA was associated with higher mortality (OR: 1.65; 95% CI: 1.07-2.53; $p=0.02$) and placement on mechanical ventilation (OR: 1.82; 95% CI: 1.22-2.71; $p<0.01$) amidst patients infected with COVID-19.

Conclusion: This study suggests that patients with RA and COVID-19 have a significantly increased likelihood of in-hospital mortality and placement on mechanical ventilation. While challenging to realize in a pandemic situation, large studies nationwide are necessary to improve our understanding of COVID-19 infection in patients diagnosed with RA."

Emerg Infect Dis: [Diminishing Immune Responses against Variants of Concern in Dialysis Patients 4 Months after SARS-CoV-2 mRNA Vaccination](#) (23 February 2022)

"Patients undergoing chronic hemodialysis were among the first to receive severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccinations because of their increased risk for severe coronavirus disease and high case-fatality rates. By using a previously reported cohort from Germany of at-risk hemodialysis patients and healthy donors, where antibody responses were examined 3 weeks after the second vaccination, we assessed systemic cellular and humoral immune responses in serum and saliva 4 months after vaccination with the Pfizer-BioNTech BNT162b2 vaccine using an interferon- γ release assay and multiplex-based IgG measurements. We further compared neutralization capacity of vaccination-induced IgG against 4 SARS-CoV-2 variants of concern (Alpha, Beta, Gamma, and Delta) by angiotensin-converting enzyme 2 receptor-binding domain competition assay. Sixteen weeks after second vaccination, compared with 3 weeks after, cellular and humoral responses against the original SARS-CoV-2 isolate and variants of concern were substantially reduced. Some dialysis patients even had no detectable B- or T-cell responses."

Long COVID and Other Post-Infectious Findings

News in Brief

"Biden announces long covid strategy as experts push for more" ([WP](#)).

"Persistent brain fog after mild COVID infection tied to CSF markers — Immune activation, immunovascular markers elevated in people with long COVID cognitive changes" ([Medpage](#)).

Long Reads

"How long covid is accelerating a revolution in medical research" ([WP](#)).

Journal Articles

JAMA Ophthalmol: [Changes in the Incidence of Retinal Vascular Occlusions After COVID-19 Diagnosis](#) (14 April 2022)

"Question: Does the incidence of retinal vascular occlusions change after COVID-19 infection?

Findings: This cohort study of 432 515 patients diagnosed with COVID-19 found that the incidence of retinal vein occlusions, but not retinal artery occlusions, appeared to increase in the 6 months after COVID-19 diagnosis.

Meaning: Patients with COVID-19 infection may have an increased risk of retinal vein occlusion in the 6 months after infection, similar to the increased risk of systemic vascular damage associated with COVID-19, and clinicians need to consider this factor when evaluating these patients."

See also: [commentary](#)

Clin Infect Dis: [Risk factors and multidimensional assessment of long COVID fatigue: a nested case-control study](#) (11 April 2022)

"Background: Fatigue is the most prevalent and debilitating long COVID symptom, however risk factors and pathophysiology of this condition remain unknown. We assessed risk factors for long COVID fatigue and explored its possible pathophysiology.

Methods: Nested case-control study in a COVID recovery clinic. Individuals with (cases) and without (controls) significant fatigue were included. We performed a multidimensional assessment evaluating various parameters, including pulmonary function tests and cardiopulmonary exercise testing, and implemented multivariable logistic regression to assess risk factors for significant long COVID fatigue.

Results: Total of 141 individuals were included. Mean age was 47 (SD 13) years; 115 (82%) were recovering from mild COVID-19. Mean time for evaluation was 8 months following COVID-19. Sixty-six (47%) individuals were classified with significant long COVID fatigue. They had significantly higher number of children, lower proportion of hypothyroidism, higher proportion of sore throat during acute illness and long COVID symptoms, and of physical limitation in daily activities. Individuals with fatigue had poorer sleep quality and higher degree of depression. They had significantly lower heart rate [153.52 (22.64) vs 163.52 (18.53), $p=0.038$] and oxygen consumption per Kg [27.69 (7.52) vs 30.71 (7.52), $p=0.036$] at peak exercise. The two independent risk factors for fatigue identified in multivariable analysis were peak exercise heart rate (odds ratio [OR] 0.79 per 10 beats/minute, 95% confidence interval [CI] 0.65-0.96, $p=0.019$); and long COVID memory impairment (OR 3.76, 95% CI 1.57-9.01, $p=0.003$).

Conclusions: Long COVID fatigue may be related to autonomic dysfunction, impaired cognition and decreased mood. This may suggest a limbic-vagal pathophysiology."

JAMA Neurol: [Postmortem Assessment of Olfactory Tissue Degeneration and Microvasculopathy in Patients With COVID-19](#) (11 April 2022)

"Question: What are the neuropathologic changes of COVID-19 in the olfactory region?

Findings: In this cohort study of 23 deceased patients with COVID-19 and 14 matched controls, more severe axon pathology, axon losses, and microvascular pathology were noted in olfactory tissue from patients with COVID-19 than that from the control individuals. The olfactory pathology was particularly severe in patients with reported smell alterations but were not associated with the clinical severity, timing of infection, or the presence of SARS-CoV-2 in the olfactory tissue.

Meaning: In the region of olfactory bulb and olfactory tract, COVID-19 infection was associated with axon pathology and microvasculopathy, particularly in patients with smell alterations; the olfactory pathology did not result from direct viral injury and may be associated with local inflammation."

MMWR: [Cardiac Complications After SARS-CoV-2 Infection and mRNA COVID-19 Vaccination — PCORnet, United States, January 2021–January 2022](#) (08 April 2022)

"What is already known about this topic? Studies have found an increased risk for cardiac complications after SARS-CoV-2 infection and mRNA COVID-19 vaccination, but few have compared these risks.

What is added by this report? Data from 40 health care systems participating in a large network found that the risk for cardiac complications was significantly higher after SARS-CoV-2 infection than after mRNA COVID-19 vaccination for both males and females in all age groups.

What are the implications for public health practice? These findings support continued use of recommended mRNA COVID-19 vaccines among all eligible persons aged ≥5 years."

Sex Med Rev: [Erectile Dysfunction as a Biomarker of Systemic Complications for COVID-19 Long Haulers](#) (07 April 2022)

"Introduction: Long term complications of COVID-19, the disease caused by the SARS-CoV-2, involve many organ systems, dramatically worsening the quality of life, and finally contributing to impaired physical functioning. Despite the presence of well-identified pathogenetic mechanisms, the effect of "Long COVID" on sexual health has been only marginally addressed.

Objectives: To provide coverage of the current literature on long COVID, its epidemiology, pathophysiology, and relevance for erectile function.

Methods: Comprehensive review of literature pertaining to the epidemiology and pathophysiology of long COVID, and its relevance for erectile function.

Results: Symptoms of long COVID are highly prevalent and involve almost all systems of the human body, with a plethora of clinical manifestations which range from minor nuisances to life-threatening conditions. "Brain fog" and fatigue are the most common complaints, although other neuropsychiatric complications, including sensory dysfunctions, anxiety, depression, and cerebrovascular events have also been reported. The respiratory and cardiovascular systems are also affected, with dyspnea, pulmonary fibrosis, endothelial dysfunction, and myocarditis occurring in some COVID long haulers. A subset of patients might develop endocrine manifestations, including onset of diabetes, thyroid dysfunction, and hypogonadism. Overall, long COVID features many complications which can impair erectile function by multiple pathogenetic mechanisms, and which could require tailored treatment: (i) careful investigation and management from the sexual medicine expert are therefore much needed, (ii) and future research on this topic is warranted.

Conclusion: in COVID-19 long haulers, several complications can adversely affect erectile function which, upon future tailored studies, could be used as biomarker for the severity of the long COVID disease and for its follow-up."

BMJ: [Risks of deep vein thrombosis, pulmonary embolism, and bleeding after covid-19: nationwide self-controlled cases series and matched cohort study](#) (06 April 2022)

"Objective: To quantify the risk of deep vein thrombosis, pulmonary embolism, and bleeding after covid-19.

Design: Self-controlled case series and matched cohort study.

Setting: National registries in Sweden.

Participants: 1 057 174 people who tested positive for SARS-CoV-2 between 1 February 2020 and 25 May 2021 in Sweden, matched on age, sex, and county of residence to 4 076 342 control participants.

Main outcomes measures: Self-controlled case series and conditional Poisson regression were used to determine the incidence rate ratio and risk ratio with corresponding 95% confidence intervals for a first deep vein thrombosis, pulmonary embolism, or bleeding event. In the self-controlled case series, the incidence rate ratios for first time outcomes after covid-19 were determined using set time intervals and the spline model. The risk ratios for first time and all events were determined during days 1-30 after covid-19 or index date using the matched cohort study, and adjusting for potential confounders (comorbidities, cancer, surgery, long term anticoagulation treatment, previous venous thromboembolism, or previous bleeding event).

Results: Compared with the control period, incidence rate ratios were significantly increased 70 days after covid-19 for deep vein thrombosis, 110 days for pulmonary embolism, and 60 days for bleeding. In particular, incidence rate ratios for a first pulmonary embolism were 36.17 (95% confidence interval 31.55 to 41.47) during the first week after covid-19 and 46.40 (40.61 to 53.02) during the second week. Incidence rate ratios during days 1-30 after covid-19 were 5.90 (5.12 to 6.80) for deep vein thrombosis, 31.59 (27.99 to 35.63) for pulmonary embolism, and 2.48 (2.30 to 2.68) for bleeding. Similarly, the risk ratios during days 1-30 after covid-19 were 4.98 (4.96 to 5.01) for deep vein thrombosis, 33.05 (32.8 to 33.3) for pulmonary embolism, and 1.88 (1.71 to 2.07) for bleeding, after adjusting for the effect of potential confounders. The rate ratios were highest in patients with critical covid-19 and highest during the first pandemic wave in Sweden compared with the second and third waves. In the same period, the absolute risk among patients with covid-19 was 0.039% (401 events) for deep vein thrombosis, 0.17% (1761 events) for pulmonary embolism, and 0.101% (1002 events) for bleeding.

Conclusions: The findings of this study suggest that covid-19 is a risk factor for deep vein thrombosis, pulmonary embolism, and bleeding. These results could impact recommendations on diagnostic and prophylactic strategies against venous thromboembolism after covid-19."

Expert Rev Respir Med: [COVID-19 patients require multi-disciplinary rehabilitation approaches to address persisting symptom profiles and restore pre-COVID quality of life](#) (06 April 2022)

"Background: Long-COVID diagnosis is prominent, and our attention must support those experiencing debilitating and long-standing symptoms. To establish patient pathways, we must consider the societal and economic impacts of sustained COVID-19. Accordingly, we sought to determine the pertinent areas impacting quality of life (QoL) following a COVID-19 infection.

Research methods: Three hundred and eighty-one participants completed a web-based survey (83% female, 17% male) consisting of 70 questions across 7 sections (demographics, COVID-19 symptoms; QoL; sleep quality; breathlessness; physical activity and mental health). Mean age, height, body mass and body mass index (BMI) were 42 ± 12 years, 167.6 ± 10.4 cm, 81.2 ± 22.2 kg, and 29.1 ± 8.4 kg.m², respectively.

Results: Participant health was reduced because of COVID-19 symptoms ("Good health" to "Poor health" [$P < 0.001$]). Survey respondents who work reported ongoing issues with performing moderate (83%) and vigorous (79%) work-related activities.

Conclusions: COVID-19 patients report reduced capacity to participate in activities associated with daily life, including employment activities. Bespoke COVID-19 support pathways must consider multi-disciplinary approaches that address the holistic needs of patients to restore pre-pandemic quality of life and address experienced health and wellbeing challenges."

Nat Commun: [Course of post COVID-19 disease symptoms over time in the ComPaRe long COVID prospective e-cohort](#) (05 April 2022)

"About 10% of people infected by severe acute respiratory syndrome coronavirus 2 experience post COVID-19 disease. We analysed data from 968 adult patients (5350 person-months) with a confirmed infection enrolled in the ComPaRe long COVID cohort, a disease prevalent prospective e-cohort of such patients in France. Day-by-day prevalence of post COVID-19 symptoms was determined from patients' responses to the Long COVID Symptom Tool, a validated self-reported questionnaire assessing 53 symptoms. Among patients symptomatic after 2 months, 85% still reported symptoms one year after their symptom onset. Evolution of symptoms showed a decreasing prevalence over time for 27/53 symptoms (e.g., loss of taste/smell); a stable prevalence over time for 18/53 symptoms (e.g., dyspnoea), and an increasing prevalence over time for 8/53 symptoms (e.g., paraesthesia). The disease impact on patients' lives began increasing 6 months after onset. Our results are of importance to understand the natural history of post COVID-19 disease."

Nat Rev Gastroenterol Hepatol: [Gastrointestinal post-acute COVID-19 syndrome](#) (05 April 2022)

"The definition of gastrointestinal involvement in post-acute COVID-19 syndrome, its frequency and its pathophysiology are still not completely understood. Here, we discuss the emerging evidence supporting immunological signatures and the unique nature of the gastrointestinal tract in this syndrome."

Open Forum Infect Dis: [Rheumatic symptoms following COVID-19: a chronic post COVID-19 condition](#) (04 April 2022)

"Background: Detailed characteristics of rheumatic symptoms of COVID-19 were still unknown. We aim to investigate the proportions, characteristics, and risk factors of this condition.

Methods: In this prospective, longitudinal cohort study, discharged patients with COVID-19 were face-to-face interviewed at 12 months after symptom onset. Rheumatic symptoms following COVID-19 included newly occurring joint pain, and (/or) joint swelling after COVID-19. The risk factors of developing rheumatic symptoms were identified by multivariable logistic regressions.

Results: In total, 1296 of 2469 discharged patients with COVID-19 were enrolled in this study. Among them, 160 (12.3% [95% CI 10.6, 14.3]) suffered from rheumatic symptoms following COVID-19 at 12-month follow-up. The most frequently involved joints were the knee joints (38%), followed by hand (25%) and shoulder (19%). Rheumatic symptoms were independent of the severity of illness and corticosteroid treatment during acute phase, while elderly (OR 1.22, 95%CI 1.06, 1.40) and women (OR 1.58, 95%CI 1.12, 2.23) were identified as the risk factors for this condition.

Conclusions: Our investigation showed a considerable proportion of rheumatic symptoms following COVID-19 in discharged patients, which highlights the need for continuing attention. Notably, rheumatic symptoms following COVID-19 were independent of the severity of illness and corticosteroid treatment during acute phase."

Pregnancy and Postpartum Period

Journal Articles

JAMA Netw Open: [Attitudes and Beliefs Associated With COVID-19 Vaccination During Pregnancy](#) (14 April 2022)

"This survey study examines the attitudes and beliefs associated with receipt of the COVID-19 vaccination during pregnancy among pregnant people....

Our study identified 2 beliefs directly associated with COVID-19 vaccine uptake during pregnancy: (1) concerns about long-term effects of the vaccine and (2) belief in the ability of the vaccine to pass immunity to the infant. Our findings highlight important factors that could be targeted by interventions to address vaccine hesitancy in pregnant people."

JAMA Netw Open: [Trends in Maternal Outcomes During the COVID-19 Pandemic in Alabama From 2016 to 2021](#) (13 April 2022)

"This cohort study assesses whether the COVID-19 pandemic is associated with an increase in the risk of maternal morbidity and mortality in Alabama from 2016 to 2021....

Findings of this cohort study identified a higher rate of maternal mortality and morbidities during both the initial and Delta pandemic periods compared with the baseline period. The first peak of increase in maternal mortality rate was likely related to mobility restrictions and the subsequent 2 peaks were observed corresponding to the increases in the total COVID cases during that period. The rates of maternal morbidities were higher than those found in a meta-analysis and other shorter duration studies."

JAMA Psychiatry: [Association of COVID-19 and Endemic Systemic Racism With Postpartum Anxiety and Depression Among Black Birthing Individuals](#) (13 April 2022)

"Question: With the emergence of the COVID-19 pandemic, a catastrophic adverse event that has disproportionately impacted Black communities, layered on top of deep-rooted historical inequities (ie, syndemic), how has the postpartum mental health of Black birthing individuals been affected?

Findings: In this cohort study of 151 Black participants, perinatal syndemic exposure was associated with negative postpartum mental health outcomes. Specifically, more negative COVID-19 experiences and higher racism scores were associated with increased risk for postpartum depression and anxiety.

Meaning: Black birthing individuals already face significant challenges throughout the peripartum period, with adverse associations with mental health, which worsened during the COVID-19 pandemic."

JAMA Pediatr: [Association of COVID-19 Vaccination During Early Pregnancy With Risk of Congenital Fetal Anomalies](#) (04 April 2022)

"In 3% to 5% of births in the US, neonates are born with structural defects, which are associated with increased infant morbidity, mortality, and billions of dollars in cost. Our findings suggest that COVID-19 vaccination during early pregnancy is not associated with an increased risk of fetal structural anomalies identified with ultrasonography."

Emerg Infect Dis: [Recurrent SARS-CoV-2 RNA Detection after COVID-19 Illness Onset during Pregnancy](#) (25 February 2022)

"The Surveillance for Emerging Threats to Mothers and Babies Network conducts longitudinal surveillance of pregnant persons in the United States with laboratory-confirmed severe acute respiratory syndrome coronavirus 2 infection during pregnancy. Of 6,551 infected pregnant persons in this analysis, 142 (2.2%) had positive RNA tests >90 days and up to 416 days after infection."

Pediatric Population

News in Brief

"Pfizer: COVID booster fights omicron in kids 5-11 — Company plans to submit data for EUA in this age group" ([Medpage](#)).

"Kids' mental health is getting worse. But that predated the pandemic" ([WP](#)).

"A report on violence against kids with disabilities is sobering — if not surprising" ([NPR](#); see also: [Lancet Child and Adolescent Health study](#)).

Long Reads

"The mystifying rise of child suicide: A family tragedy sheds light on a burgeoning mental-health emergency" ([New Yorker](#)).

"Orphaned by gun violence: Two kids, two shootings, two parents gone — Every day in America, more than 40 children lose a parent to shootings, new Post data reveals. Kaleigh and Kavon Washington lost both" ([WP](#)).

Journal Articles

Clin Infect Dis: [COVID-19 Disease Severity in Children Infected with the Omicron Variant](#) (11 April 2022)

"Background: There are limited data assessing COVID-19 disease severity in children/adolescents infected with the Omicron variant.

Methods: We identified children and adolescents <18 years with SARS-CoV-2 infection with Delta and propensity-score matched controls with Omicron variant infection from the National COVID-19 Database in Qatar. Primary outcome was disease severity, determined by hospital admission, admission to ICU, or mechanical ventilation within 14 days of diagnosis, or death within 28 days.

Results: Among 1,735 cases with Delta variant infection between June 1 and November 6, 2021 and 32 635 cases with Omicron variant infection between January 1 and January 15, 2022 who did not have prior infection and were not vaccinated, we identified 985 propensity-score matched pairs. Among Delta infected, 84.2% had mild, 15.7% had moderate, and 0.1% had severe/critical disease. Among Omicron infected, 97.8% had mild, 2.2% had moderate, and none had severe/critical disease ($P < .001$). Omicron variant infection (vs. Delta) was associated with significantly lower odds of moderate or severe/critical disease (adjusted odds ratio, 0.12; 95% CI 0.07-0.18). Those aged 6-11, and 12-<18 years had lower odds of developing moderate or severe/critical disease compared

with those younger than six years (aOR, 95% CI 0.47; 0.33-0.66 for 6-11 year old; aOR 0.45, 95% CI 0.21-0.94 for 12-<18 years old).

Conclusions: Omicron variant infection in children/adolescents is associated with less severe disease than Delta variant infection as measured by hospitalization rates and need for ICU care or mechanical ventilation. Those 6 to <18 years also have less severe disease than those <6 years old."

CMAJ: [Predictors of severe illness in children with multisystem inflammatory syndrome after SARS-CoV-2 infection: a multicentre cohort study](#) (11 April 2022)

"Background: SARS-CoV-2 infection can lead to multisystem inflammatory syndrome in children (MIS-C). We sought to investigate risk factors for admission to the intensive care unit (ICU) and explored changes in disease severity over time.

Methods: We obtained data from chart reviews of children younger than 18 years with confirmed or probable MIS-C who were admitted to 15 hospitals in Canada, Iran and Costa Rica between Mar. 1, 2020, and Mar. 7, 2021. Using multivariable analyses, we evaluated whether admission date and other characteristics were associated with ICU admission or cardiac involvement.

Results: Of 232 children with MIS-C (median age 5.8 yr), 130 (56.0%) were male and 50 (21.6%) had comorbidities. Seventy-three (31.5%) patients were admitted to the ICU but none died. We observed an increased risk of ICU admission among children aged 13-17 years (adjusted risk difference 27.7%, 95% confidence interval [CI] 8.3% to 47.2%), those aged 6-12 years (adjusted risk difference 25.2%, 95% CI 13.6% to 36.9%) or those with initial ferritin levels greater than 500 µg/L (adjusted risk difference 18.4%, 95% CI 5.6% to 31.3%). Children admitted to hospital after Oct. 31, 2020, had numerically higher rates of ICU admission (adjusted risk difference 12.3%, 95% CI -0.3% to 25.0%) and significantly higher rates of cardiac involvement (adjusted risk difference 30.9%, 95% CI 17.3% to 44.4%). At Canadian sites, the risk of ICU admission was significantly higher for children admitted to hospital between December 2020 and March 2021 than those admitted between March and May 2020 (adjusted risk difference 25.3%, 95% CI 6.5% to 44.0%).

Interpretation: We observed that age and higher ferritin levels were associated with more severe MIS-C. We observed greater severity of MIS-C later in the study period. Whether emerging SARS-CoV-2 variants pose different risks of severe MIS-C needs to be determined."

J Clin Endocrinol Metab: [Changes in Type 2 diabetes trends in Children and Adolescents during the COVID-19 Pandemic](#) (04 April 2022)

"Purpose: To examine whether trends in new-onset pediatric type 2 diabetes (T2D) -- inclusive of patients requiring hospitalization and patients managed outpatient -- were

impacted during the COVID-19 pandemic, and to compare patient characteristics prior to and during COVID-19.

Methods: A retrospective single-center medical-record review was conducted in a hospital which cares for 90% of Alabama's pediatric T2D patients. Patients with new-onset T2D referred from March 2017-March 2021 were included. Counts of patients presenting per month ("monthly rates") were computed. Linear regression models were estimated for the full sample and stratified by Medicaid and non-Medicaid insurance status. Patient characteristics prior to versus during COVID-19 were compared.

Results: 642 patients presented with new-onset T2D over this period. Monthly rates were 11.1 ± 3.8 prior to COVID-19, 19.3 ± 7.8 during COVID-19 ($p=0.004$). Monthly rates for Medicaid patients differed prior to and during COVID-19 (7.9 ± 3.4 vs 15.3 ± 6.6 , $p = 0.003$) but not for non-Medicaid patients (3.3 ± 1.7 vs 4.0 ± 2.4 , $p=0.33$). Regression results showed significant increases in monthly rates during COVID-19 for the full sample ($\beta=$, $p<0.05$) and for Medicaid enrollees ($\beta=$, $p<0.05$). Hospitalization-rate, severity of obesity, and hemoglobin A1c remained similar prior to and during COVID-19, though the proportion of male patients increased from 36.8% to 46.1% ($p=0.021$).

Conclusions: A rise in new-onset T2D was observed among Alabama's youth during the COVID-19 pandemic, a burden that disproportionately affected Medicaid enrollees and males. Future research should explore the pathways through which the pandemic impacted pediatric T2D."

Healthcare Workers

News in Brief

"Why nurses are raging and quitting after the RaDonda Vaught verdict" ([KHN](#)).

Long Reads

"America needs more doctors and nurses to survive the next pandemic: Staff shortages crippled America's Covid-19 response. That can't happen again" ([Vox](#)).

Journal Articles

Am J Infect Control: [Reported exposure trends among healthcare personnel COVID-19 cases, USA, March 2020–March 2021](#) (13 April 2022)

"Background: Health care personnel (HCP) have experienced significant SARS-CoV-2 risk, but exposure settings among HCP COVID-19 cases are poorly characterized.

Methods: We assessed exposure settings among HCP COVID-19 cases in the United States from March 2020 to March 2021 with reported exposures (n = 83,775) using national COVID-19 surveillance data. Exposure setting and reported community incidence temporal trends were described using breakpoint estimation. Among cases identified before initiation of COVID-19 vaccination programs (n = 65,650), we used separate multivariable regression models to estimate adjusted prevalence ratios (aPR) for associations of community incidence with health care and household and/or community exposures.

Results: Health care exposures were the most reported (52.0%), followed by household (30.8%) and community exposures (25.6%). Health care exposures and community COVID-19 incidence showed similar temporal trends. In adjusted analyses, HCP cases were more likely to report health care exposures (aPR = 1.31; 95% CI:1.26-1.36) and less likely to report household and/or community exposures (aPR = 0.73; 95% CI:0.70-0.76) under the highest vs lowest community incidence levels.

Discussion: These findings highlight HCP exposure setting temporal trends and workplace exposure hazards under high community incidence. Findings also underscore the need for robust collection of work-related data in infectious disease surveillance.

Conclusions: Many reported HCP cases experienced occupational COVID-19 exposures, particularly during periods of higher community COVID-19 incidence."

JAMA Health Forum: [Tracking Turnover Among Health Care Workers During the COVID-19 Pandemic: A Cross-sectional Study](#) (08 April 2022)

"Question: Which health care workers were at highest risk of leaving the workforce during the COVID-19 pandemic compared with prepandemic levels?

Findings: This observational cross-sectional study among 125 717 health care workers found that long-term care workers and physicians saw an upward trend in turnover rates. Health care workers employed as health aides and assistants, those of historically marginalized racial and ethnic groups, and those with young children, particularly women, had persistently high turnover rates and were experiencing a slow recovery.

Meaning: These findings suggest that turnover rates are returning to prepandemic levels across most groups of health care workers, yet the recovery is uneven; targeted solutions are needed to ensure an adequate health care workforce is available to meet patient demand."

J Gen Intern Med: [Patterns of Potential Moral Injury in Post-9/11 Combat Veterans and COVID-19 Healthcare Workers](#) (05 April 2022)

"Background: Moral injury has primarily been studied in combat veterans but might also affect healthcare workers (HCWs) due to the COVID-19 pandemic.

Objective: To compare patterns of potential moral injury (PMI) between post-9/11 military combat veterans and healthcare workers (HCWs) surveyed during the COVID-19 pandemic.

Design: Cross-sectional surveys of veterans (2015-2019) and HCWs (2020-2021) in the USA.

Participants: 618 military veterans who were deployed to a combat zone after September 11, 2001, and 2099 HCWs working in healthcare during the COVID-19 pandemic.

Main measures: Other-induced PMI (disturbed by others' immoral acts) and self-induced PMI (disturbed by having violated own morals) were the primary outcomes.

Sociodemographic variables, combat/COVID-19 experience, depression, quality of life, and burnout were measured as correlates.

Key results: 46.1% of post-9/11 veterans and 50.7% of HCWs endorsed other-induced PMI, whereas 24.1% of post-9/11 veterans and 18.2% of HCWs endorsed self-induced PMI.

Different types of PMI were significantly associated with gender, race, enlisted vs. officer status, and post-battle traumatic experiences among veterans and with age, race, working in a high COVID-19-risk setting, and reported COVID-19 exposure among HCWs. Endorsing either type of PMI was associated with significantly higher depressive symptoms and worse quality of life in both samples and higher burnout among HCWs.

Conclusions: The potential for moral injury is relatively high among combat veterans and COVID-19 HCWs, with deleterious consequences for mental health and burnout.

Demographic characteristics suggestive of less social empowerment may increase risk for moral injury. Longitudinal research among COVID-19 HCWs is needed. Moral injury prevention and intervention efforts for HCWs may benefit from consulting models used with veterans."

Emerg Infect Dis: [Durability of Antibody Response and Frequency of SARS-CoV-2 Infection 6 Months after COVID-19 Vaccination in Healthcare Workers](#) (24 February 2022)

"Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) antibodies decay but persist 6 months postvaccination; lower levels of neutralizing titers persist against Delta than wild-type virus. Of 227 vaccinated healthcare workers tested, only 2 experienced outpatient symptomatic breakthrough infections, despite 59/227 exhibiting serologic evidence of SARS-CoV-2 infection, defined as presence of nucleocapsid protein antibodies."

Mental Health and Wellness

News in Brief

"People are developing trauma-like symptoms as the pandemic wears on" ([NPR](#)).

Long Reads

"The pandemic has trapped millions in unending grief: COVID is now the third leading cause of death—and therefore the third leading cause of grief—in the United States" ([Atlantic](#)).

"As US nears 1 million covid deaths, one hard-hit county grapples with unthinkable loss" ([KHN](#)).

Journal Articles

JAMA Health Forum: [The COVID-19 Pandemic and Mental Health—Implementing Evidence-Based Interventions to Advance Equity and Reverse a Worsening Crisis](#) (14 April 2022)

"The mental health crisis that has been intensified by the COVID-19 pandemic, as well as its disparate effects on marginalized communities, make shifting to prevention and to expansion of evidence-based mental health interventions even more urgent. Evidence that common mental disorders can be treated and prevented is strong. However, to avoid widening disparities, a strong focus on addressing social determinants and access barriers is needed. Implementing and disseminating evidence-based, equity-focused interventions that leverage technology holds promise for mitigating current morbidity and preventing a worsening of the mental health crisis."

MSMR: [COVID-19 and depressive symptoms among active component U.S. service members, January 2019-July 2021 \[pdf\]](#) (January 2022)

"This study examined the rates of depressive symptoms in active component U.S. service members prior to and during the COVID-19 pandemic and evaluated whether SARS-CoV-2 test results (positive or negative) were associated with self-reported depressive symptoms. Depressive symptoms were measured by the Patient Health Questionnaire-2 (PHQ-2) screening instrument and were defined as positive if the total score was 3 or greater. From 1 January 2019 through 31 July 2021, 2,313,825 PHQ-2s were completed with an increase in the positive rate from 4.0% to 6.5% (absolute % difference, +2.5%; relative % change, +67.1%) from the beginning to the end of the period. While there was a gradual increase of 19.8% in the months prior to the pandemic (1.4%/month average), this increase grew to 40.4% during the pandemic (2.5%/month average). However, no association was found between a positive or negative SARS-CoV-2 test result and the PHQ-2 screening instrument result. These findings suggest that the accelerated increase in depressive symptoms is likely a function of the environment of the COVID-19 pandemic instead of the SARS-CoV-2

infection itself. Further research to better understand specific factors of the pandemic leading to depressive symptoms will improve efficient allocation of military medical resources and safeguard military medical readiness."

Other Infectious Diseases and Public Health Threats

News in Brief

"As the world around us moves on, we ID docs just ... can't" ([NEJM JW](#)).

The CDC is investigating an outbreak in Florida of meningococcal disease in men who have sex with men ([CDC](#)).

"FDA investigating as hundreds post about experiencing stomach illness after eating Lucky Charms" ([NBC](#)).

"WHO group endorses 'game-changer' 1-dose HPV vaccination" ([CIDRAP](#)).

Long Reads

"The FDA's food failure: A POLITICO investigation based on more than 50 interviews finds the FDA is failing to meet American consumers' expectations on food safety and nutrition" ([Politico](#); see also: [Politico short article on 4 takeaways](#)).

"Finding the next pandemic virus before it finds us: The tricky work of seeking, sequencing, and sharing viruses around the world" ([Vox](#)).

"Judge rules US military can't discharge HIV-positive troops" ([AP](#)).

Journal Articles

Lancet Infect Dis: [Effectiveness of a serogroup B outer membrane vesicle meningococcal vaccine against gonorrhoea: a retrospective observational study](#) (12 April 2022)

"Background: Declining antimicrobial susceptibility to current gonorrhoea antibiotic treatment and inadequate treatment options have raised the possibility of untreatable gonorrhoea. New prevention approaches, such as vaccination, are needed. Outer membrane vesicle meningococcal serogroup B vaccines might be protective against gonorrhoea. We evaluated the effectiveness of a serogroup B meningococcal outer membrane vesicle vaccine (MenB-4C) against gonorrhoea in individuals aged 16–23 years in two US cities.

Methods: We identified laboratory-confirmed gonorrhoea and chlamydia infections among individuals aged 16–23 years from sexually transmitted infection surveillance records in New York City and Philadelphia from 2016 to 2018. We linked gonorrhoea and chlamydia case records to immunisation registry records to determine MenB-4C vaccination status at infection, defined as complete vaccination (two MenB-4C doses administered 30–180 days apart), partial vaccination (single MenB-4C vaccine dose), or no vaccination (serogroup B meningococcal vaccine naive). Using log-binomial regression with generalised estimating equations to account for correlations between multiple infections per patient, we calculated adjusted prevalence ratios (APR) and 95% CIs to determine if vaccination was protective against gonorrhoea. We used individual-level data for descriptive analyses and infection-level data for regression analyses.

Findings: Between Jan 1, 2016, and Dec 31, 2018, we identified 167 706 infections (18 099 gonococcal infections, 124 876 chlamydial infections, and 24 731 gonococcal and chlamydial co-infections) among 109 737 individuals linked to the immunisation registries. 7692 individuals were vaccinated, of whom 4032 (52·4%) had received one dose, 3596 (46·7%) two doses, and 64 (<1·0%) at least three doses. Compared with no vaccination, complete vaccination series (APR 0·60, 95% CI 0·47–0·77; $p<0·0001$) and partial vaccination series (0·74, 0·63–0·88; $p=0·0012$) were protective against gonorrhoea. Complete MenB-4C vaccination series was 40% (95% CI 23–53) effective against gonorrhoea and partial MenB-4C vaccination series was 26% (12–37) effective.

Interpretation: MenB-4C vaccination was associated with a reduced gonorrhoea prevalence. MenB-4C could offer cross-protection against *Neisseria gonorrhoeae*. Development of an effective gonococcal vaccine might be feasible with implications for gonorrhoea prevention and control."

MMWR: [Monkeypox in a Traveler Returning from Nigeria — Dallas, Texas, July 2021](#) (08 April 2022)

"Monkeypox is a rare, sometimes life-threatening zoonotic infection that occurs in west and central Africa. It is caused by Monkeypox virus, an orthopoxvirus similar to Variola virus (the causative agent of smallpox) and Vaccinia virus (the live virus component of orthopoxvirus vaccines) and can spread to humans. After 39 years without detection of human disease in Nigeria, an outbreak involving 118 confirmed cases was identified during 2017-2018 (1); sporadic cases continue to occur. During September 2018-May 2021, six unrelated persons traveling from Nigeria received diagnoses of monkeypox in non-African countries: four in the United Kingdom and one each in Israel and Singapore. In July 2021, a man who traveled from Lagos, Nigeria, to Dallas, Texas, became the seventh traveler to a non-African country with diagnosed monkeypox. Among 194 monitored contacts, 144 (74%) were flight contacts. The patient received tecovirimat, an antiviral for treatment of orthopoxvirus infections, and his home required large-scale decontamination. Whole genome sequencing

showed that the virus was consistent with a strain of Monkeypox virus known to circulate in Nigeria, but the specific source of the patient's infection was not identified. No epidemiologically linked cases were reported in Nigeria; no contact received postexposure prophylaxis (PEP) with the orthopoxvirus vaccine ACAM2000."

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